

Docket No. 046301-053000

Serial No.: 10/067,496

Page 2

Amendments to the Specification where added material is shown in underlined type, deleted material is shown in ~~strikeout type~~:

Please replace paragraphs [12] with the following amended paragraph:

[12] A method and system for implementing a system acquisition function for use with a communication device is provided. According to one exemplary embodiment of the system, the system acquisition function is embodied in a searcher. The searcher is embedded in the communication device, such as, a mobile phone. The searcher includes one or more computational units which are used to perform a PN sequence generation function to generate PN sequences. Each PN sequence is comprised of a number of PN codes chips. The searcher further includes a number of computational units which are used to correlate received signal samples with the PN codes chips generated by the PN sequence generation function. As each signal sample is received by the communication device, the received signal sample is correlated (complex multiplied) with a PN sequence in a parallel manner using the computational units. The sample correlation results are then respectively accumulated within each computational unit that conducts the corresponding sample correlation. As the next signal sample is received, this newly received signal sample is similarly correlated with the next PN sequence in a parallel manner. Likewise, the sample correlation results are also accumulated. The foregoing process is repeated until all the signal samples needed to complete a signal correlation are received and correlated with the PN sequences. The number of PN codes chips within a PN sequence used to correlate with each received signal sample is equivalent to a correlation length chosen such that the correlation results between each received signal sample and the locally generated PN sequence are sufficiently reliable to determine whether the strongest pilot is found.

Please replace paragraphs [22] with the following amended paragraph:

[22] The PN sequences used by the computational units 12a-m are generated in a successive, offset order. The starting position of each successive PN sequence is only one chip off from the preceding PN sequence. The PN codes chips of each PN sequence can be provided to the computational units 12a-m in a number of ways. For example, the PN codes chips can be generated by either a PN sequence generator implemented in the form of another computational unit (not shown) or a RISC processor. As will be described further below, each PN code chip is shifted into a corresponding computational unit 12a-m. Each computational unit 12a-m includes a local memory for storing its corresponding PN code chip.

10507438 1

Docket No. 046301-053000

Serial No.: 10/067,496

Page 3

Please replace paragraphs [24] – [25] with the following amended paragraphs:

[24] Referring to Fig. 2, there are  $m$  computational units 20a-m within the searcher 10. At time  $t_0$ , signal sample  $R_0$  is received by a receiver (not shown) located within the communication device. Signal sample  $R_0$  is then correlated with the PN sequence,  $P_0P_1...P_{M-1}$ . The PN sequence,  $P_0P_1...P_{M-1}$ , is generated by a PN sequence generator (~~not shown~~ shown in FIG. 6) located within the communication device. Since there are  $M$  PN ~~codes~~ chips within the PN sequence,  $M$  computational units 20a-m are used to do the correlations in parallel. Hence, each computational unit 20a-m correlates the signal sample  $R_0$  with one PN ~~code~~ chip. For example, computational unit 20a correlates  $R_0$  with  $P_0$  to generate correlation result  $R_0 P_0$ . The collective correlation results generated by the computational units 20a-m are as follows:  $R_0 P_0, R_0 P_1, ..., R_0 P_{M-1}$ . The correlations are performed and the correlation results are respectively accumulated into the computational units 20a-m before the next signal sample  $R_1$  is received at time  $t_1$ . The signal sample  $R_0$  may then be discarded after the correlations are performed.

[25] At time  $t_1$ , signal sample  $R_1$  is received. Signal sample  $R_1$  is then correlated with a second PN sequence,  $P_1P_2...P_M$ . The PN sequence,  $P_1P_2...P_M$ , is only a shift of the PN sequence used at time  $t_0$  plus a newly generated PN ~~code~~ chip  $P_M$ . That is, the start of the new PN sequence is offset by one chip from the preceding PN sequence. Consequently, the new PN sequence can be supplied to or propagated through the computational units 20a-m as follows. Except for the last computational unit 20m, each computational unit 20a-1 receives its corresponding PN ~~code~~ chip for the next correlation from its neighbor. The last computational unit 20m receives its corresponding PN ~~code~~ chip  $P_M$  from the PN sequence generator. In other words, except for the first computational unit 20a, each remaining computational unit 20b-m passes its current PN ~~code~~ chip to its neighbor in the same direction. As to the first computational unit 20a, its current PN ~~code~~ chip is discarded; and as to the last computational unit 20m, as mentioned above, the PN sequence generator provides the next PN ~~code~~ chip. For example, after the correlations are completed for the received signal sample  $R_0$  (which is some time before time  $t_1$ ), computational unit 20a discards its current PN ~~code~~ chip  $P_0$  and receives its next PN ~~code~~ chip (which will be  $P_1$ ) from computational unit 20b; computational unit 20m passes its current PN ~~code~~ chip  $P_{M-1}$  to its neighboring computational unit 20l (not shown) and receives its next PN ~~code~~ chip  $P_M$  from the PN sequence generator; and the remaining computational units 20b-l pass their current PN ~~codes~~ chips respectively to their neighbors in one direction and receive their next PN ~~codes~~ chips respectively from their neighbors in the other direction.

1050747X 1

Docket No. 046301-053000

Serial No.: 10/067,496

Page 4

Please replace paragraphs [29] with the following amended paragraphs:

[29] At time  $t_{n+1}$ , the signal sample  $R_{n+1}$  is correlated with the next PN sequence,  $P_{n+M+1}P_{n+M+2}\dots P_{n+2M}$ . Similarly, the start of this next PN sequence is offset from the preceding PN sequence by one chip and a new PN ~~code~~ chip is added at the end. This process will continue until the second round of correlations is completed. For the second round of real-time correlations, another M PN offsets ( $P_M, P_{M+1}, \dots, P_{2M+1}$ ) are searched. The correlation results are then stored and cleared from each computational unit 20a-m before the next round of correlations starts.

Please replace the three paragraphs following paragraph [34] with the following amended paragraphs:

Fig. 6 is a block diagram illustrating an exemplary system 100 embodiment in accordance with the present invention. As illustrated, an exemplary system 100, for implementing a system acquisition function to facilitate PN code searching, comprises: a PN sequence generator 110 configured to generate a plurality of PN sequences; and a searcher 10 having a plurality of computational units 20a - 20m forming a correlator 130 and configurable to correlate a received signal sample (from receiver 120) with a PN sequence generated by the PN sequence generator, the ~~correlation~~ correlations being executed in a parallel manner. As discussed above, the plurality of PN sequences are generated in a sequential manner; the plurality of PN sequences includes a first PN sequence and a second PN sequence, the second PN sequence immediately following the first PN sequence; and the start of the second PN sequence is determined by shifting the first PN sequence. In addition, a number of computational units from the plurality of computational units are selectively configured to correlate the received signal sample with the PN sequence, with the number of computational units which are selectively configured to correlate the received signal with the PN sequence depending on availability of the plurality of computational units.

Fig. 7 is a flow diagram illustrating a first exemplary method embodiment for implementing a system acquisition function to facilitate PN code searching in accordance with the present invention. The first exemplary method begins with generating a first PN sequence, the first PN sequence being made up of a plurality of PN codes chips, step 205, and receiving a first signal sample, step 210. The first signal sample is correlated with the first PN sequence upon receiving the first signal sample, step 215, and a correlation result from the correlation between the first signal sample and the first PN sequence is stored, step 220. A second PN sequence is generated by

10307438.3

Docket No. 046301-053000

Serial No.: 10/067,496

Page 5

shifting the first PN sequence and adding an additional PN ~~code~~ chip, step 225, and a second signal sample is received, step 230. The second signal sample is correlated with the second PN sequence, step 235, and the methodology accumulates a correlation result from the correlation between the second signal sample and the second PN sequence with the correlation result from the correlation between the first signal sample and the first PN sequence, step 240. The method then repeats the above generating, receiving, correlating and accumulating steps with each received signal sample and each newly generated PN sequence, step 245.

Fig. 8 is a flow diagram illustrating a second exemplary method embodiment for implementing a system acquisition function to facilitate PN code searching in accordance with the present invention. The second exemplary method begins with maintaining a plurality of configurable computational units, step 305, and receiving a plurality of ~~signals~~ signal samples, step 310. One or more of the plurality of configurable computational units are configured to implement a PN sequence generator to generate a plurality of PN sequences, step 315. One or more of the plurality of configurable computational units are configured to implement a correlator to correlate the plurality of ~~signals~~ signal samples with the plurality of PN sequences, step 320. Each one of the plurality of ~~signals~~ signal samples is correlated with a corresponding one of the plurality of PN sequences at the time when each one of the plurality of ~~signals~~ signal samples is received, step 325. As discussed above, the number of configurable computational units used to implement the correlator depends on availability of the plurality of configurable computational units. In addition, the method may also provide for generating the plurality of PN sequences in a sequential manner, wherein the plurality of PN sequences includes a first PN sequence and second PN sequence, the second PN sequence immediately following the first PN sequence, and wherein the start of the second PN sequence is determined by shifting the first PN sequence.